EXHIBIT 16

UNITED STATES DISTRICT COURT
DISTRICT OF NEVADA

SIGNIFY NORTH AMERICA CORPORATION and SIGNIFY HOLDING B.V., Plaintiffs, vs. LEPRO INNOVATION INC, LE INNOVATION INC, INNOVATION RULES INC., HOME EVER INC., and LETIANLIGHTING, INC., Defendants.	Civil No. 2:22-cv-02095-JAD-DJA **EXPERT DECLARATION OF DR. REGAN ZANE**

I. INTRODUCTION

1. My name is Dr. Regan Zane. I have been retained by counsel for Plaintiffs Signify North America Corporation and Signify Holding B.V. (collectively, "Signify") to provide my opinions regarding U.S. Patent No. 8,063,577 ('577 Patent"). I understand that the '577 patent is at issue in the above-captioned suit against LEPRO Innovation Inc, LE Innovation Inc, Innovation Rules Inc., Home Ever Inc., and Letianlighting, Inc. (collectively, "Defendants"). Unless otherwise stated, the matters contained in this declaration are of my own personal knowledge and, if called as a witness, I could and would testify competently and truthfully with regard to the matters set forth herein.

2. My opinions are based on my years of education, research and experience, as well as my investigation and study of the relevant materials. A list of materials considered is attached as Exhibit C to this declaration.

3. I may rely upon these materials, my knowledge and experience, and/or additional materials, documents, and information in forming my opinions. I may also consider additional documents and information as it becomes available or as I am asked to do so. I reserve all rights I

may have to consider and comment on any statements or testimony of Defendants' experts in this matter.

4. My analysis of materials relevant to this Action is ongoing, and I may continue to review new material as it becomes available. This declaration represents only those opinions I have formed to date. I reserve the right to revise, supplement, and/or amend my opinions stated herein based on new information and on my continuing analysis of the materials already provided. I also reserve the right to prepare exhibits for use in Court if called upon to testify.

5. I am being compensated at my usual hourly consulting rate for my time spent working on issues in this case. My compensation does not depend upon the outcome of this matter or the opinions I express.

II. QUALIFICATIONS

6. I have summarized in this section my educational background, work experience, and other relevant qualifications. A true and correct copy of my curriculum vitae and list of recent cases are attached as Exhibits A to this declaration.

7. I am the David G. and Diann L. Sant Endowed Professor of Electrical and Computer Engineering at Utah State University (USU), and I have over 25 years of experience with power electronics and lighting technologies, including light-emitting diodes (LEDs) and driver circuits.

8. I received my Bachelor of Science degree in Electrical Engineering (BSEE) from the University of Colorado at Boulder in 1996. In 1998, I received a Master of Science degree in Electrical Engineering (MSEE) from the University of Colorado at Boulder. In 1999, I received a Doctor of Philosophy (Ph.D.) degree in electrical engineering from the University of Colorado at Boulder. My Ph.D. dissertation research focused on the design of low-cost, high performance custom integrated circuit (IC) controllers and gate drives for isolated AC/DC power converters.

9. In 1999, I joined the Corporate Research and Development Center at General Electric (GE) as a Senior Research Scientist. At GE, I developed and commercialized electronic ballasts and driver circuits using custom integrated circuits (IC) for a wide range of applications, including multiple generations of controllers for compact fluorescent lamps (e.g., residential lighting), high

intensity discharge lamps (e.g., commercial lighting), and light emitting diodes (LEDs). In my experience at GE I had custom power ICs fabricated at the Taiwan Semiconductor Manufacturing Corporation (TSCM), led laboratory system testing and evaluation, and transitioned the circuits to GE Lighting for pre-production testing. The success of this work led to my Six Sigma Green Belt certification at GE.

10. In 2001, I joined the Department of Electrical, Computer, and Energy Engineering at the University of Colorado at Boulder (CU Boulder) as an Assistant Professor, and I received tenure and was promoted to Associate Professor in 2008. While at CU Boulder, I was one of three faculty members at the Colorado Power Electronics Center (CoPEC), where we developed power solutions in close partnership with industry sponsors. I led numerous research and development (R&D) projects with industry partners on topics including LED drivers, power IC design, analog and digital control of power converters, magnetics design, solar power systems, voltage regulation modules for processors, and power distribution in data centers.

11. In 2004 I received the National Science Foundation (NSF) CAREER award, the highest honor provided by NSF to early career faculty, for my R&D and commercialization work on electronic circuits and drivers for LED lighting. My work at CU Boulder on drivers for LEDs and gas discharge lamps led to numerous publications, patents, and graduated students who have become prominent leaders in the industry. In 2006 I received the Inventor of the Year and Provost Faculty achievement awards for continued advancements to state-of-the-art in the areas of power electronics and energy efficient lighting. In 2008, I received the national recognition through the IEEE Power Electronics Society Richard M. Bass Award for outstanding achievement in the field of power electronics based on my work in the lighting and control areas. At CU Boulder I also taught courses and provided industry seminars and training on electronic circuit design, the fundamentals of power electronics, and advanced courses in modeling and control of power converters, and I received the Holland Teaching Award and the John and Mercedes Peebles Innovation in Teaching Award.

12. In 2012, I became a Full Professor with a USTAR endowment in the Department of Electrical and Computer Engineering at Utah State University (USU). There, I founded and continue to direct the Electric Vehicle & Roadway (EVR) Research Facility and Test Track, the USU Power Electronics Lab (UPEL), and the Battery Limits and Survivability Test (BLAST) lab. In 2016, I formed and launched the multi-university industry sponsored Center for Sustainable Electrified Transportation (SELECT) focused on advanced technologies for electric drive and battery systems for EVs. In 2018, I received and continue to hold the David G. and Diann L. Sant Endowed Professorship at Utah State University.

13. In 2020, I became the founding Director of the NSF Engineering Research Center for Advancing Sustainability through Powered Infrastructure for Roadway Electrification (ASPIRE ERC), the highest award offered by NSF for multi-university, industry-partnered research centers. The ASPIRE ERC includes 10 universities, 4 national labs, more than 85 faculty and staff, more than 300 students, and more than 60 industry and innovation partners. The partners include representation from automotive original equipment manufacturers (OEMs), Tier 1 component suppliers, utilities, battery manufacturers, national laboratories, and a wide range of state, government, and non-profit agencies.

14. While at USU I have led numerous large-scale R&D and commercialization programs on technologies for lighting systems, battery systems, electric vehicles (EVs), and battery charging infrastructure. As one example, I was the lead principle investigator (PI) for a multi-million dollar, multi-year project in partnership with key industry and national lab partners where we developed new concepts for advanced active battery management systems that were conceived, modeled, and simulated, then developed into hardware prototypes, integrated into commercial battery packs for a leading automotive OEM plug-in hybrid electric vehicle, evaluated for over one year of testing, and finally transitioned for commercialization at a leading automotive OEM.

15. Multiple additional projects on advanced lighting systems, battery management systems, and power converters for a wide range of applications have stemmed from this early work and continue in my research laboratory today. These include development, testing and delivery of

plug-and-play portable lithium ion battery packs for vehicles and DC microgrids in military applications, robust battery solutions for electric aircraft, high power fast charging battery packs for electric vehicles, and battery management systems for second life application of batteries that provide support to the electric utility grid. This work has received numerous awards, including the Utah Innovation Award in Clean Technology and Energy for "Robust and Efficient Battery Management Systems" and the USU Campus Research of the Year Award.

16. Since 2006, I have served as an Associate Editor with IEEE Transactions on Power Electronics. In addition, since 2013 I have served as an Associate Editor for the IEEE Journal of Emerging and Selected Topics in Power Electronics. I have served as conference chairman, co-chair, session chair, and committee member for numerous professional conferences in power electronics over the past 20 years and maintained active participation as a journal article reviewer and elected professional society leader.

17. I am a named inventor on 36 issued United States patents with many pending in the field of power electronics, including multiple in the areas of lighting systems and power electronic technologies. I have authored or co-authored over 200 peer-reviewed journal and top-rated conference papers and articles and have received 3 best journal paper awards. I am co-author of the book titled "Digital control of high-frequency switched-mode power converters," and have provided more than 60 invited seminars and talks. In my more than 20 years as a faculty member, I have trained, advised, and supervised hundreds of students in laboratory work and I have led multi-million-dollar projects in partnership with industry that include hardware prototype development and evaluation, systems demonstration, and pilot deployment in commercial settings. In all, I have been a lead or co-lead on competitive R&D and commercialization projects in partnership with industry totaling over $85 million leading to well over 100 hardware systems that have been developed and tested in my labs.

III. SCOPE OF OPINIONS

18. I have been asked to provide my opinions regarding the meaning of certain disputed claim terms as understood by one of ordinary skill at the time of the claimed inventions. My opinions

are based on my understanding of the disputed claim terms and proposed constructions and the evidence relied upon by the parties.

IV. LEGAL STANDARDS RELIED UPON

19. In addition, for purposes of this declaration, counsel has instructed me to make the following assumptions:

20. Claim construction is solely a matter for the Court to decide and, in general, the ordinary meaning of the claim terms used in the patent to one of ordinary skill in the art is determined in the context of the patent's specification and the file history.

21. A "person of ordinary skill in the art" is a hypothetical person who is presumed to have known the relevant art at the time of the invention. I discuss a person of ordinary skill in the art below.

22. Claims are construed from the perspective of a person of ordinary skill as of the effective filing date of the patent application.

23. The claims define the invention and the terms used in the claims are generally given the ordinary and customary meanings they would have to a person of ordinary skill in the art at the time of the effective filing date of the application. The context of a claim can be particularly helpful, and other claims may inform the meaning of a term in a particular claim. Terms are normally used consistently throughout a patent. Thus, the meaning of a term may help inform the meaning of the same term in other claims. Differences between claims may also help define the terms, although this may not be the case where the specification or prosecution history indicate that such differences do not impact the scope of the claims.

24. Persons of ordinary skill in the art are deemed to read the claims in the context of the entire patent, including the specification and prosecution history. In other words, the terms are not considered in a vacuum.

25. Reference materials that were publicly available at the time that the patent application was filed, such as dictionaries, treatises or other technical references, may provide context and background for deciphering how one of ordinary skill in the art would have considered

the terms used in the claims. However, I understand that such references, as well as testimony (including this declaration) are generally known as "extrinsic evidence," and are accorded less weight than evidence found within the patent and prosecution history. In addition, I understand that extrinsic evidence that is inconsistent with the claims, specification, or prosecution history should not be considered in the claim construction process.

V. LEVEL OF ORDINARY SKILL IN THE ART

26. I have been asked to offer my opinion regarding the level of ordinary skill in the art with respect to the '577 Patent.

27. I have been informed that a person of ordinary skill in the art (a "POSITA") is a hypothetical person who is used to analyze the prior art without the benefit of hindsight. I have been instructed that the level of ordinary skill may be reflected by the prior art of record, and that a POSITA to which the claimed subject matter pertains would have the capability of understanding the scientific and engineering principles applicable to the pertinent art.

28. I have been instructed there are multiple factors relevant to determining the level of ordinary skill in the pertinent art, including (1) the levels of education and experience of persons working in the field at the time of the invention; (2) the sophistication of the technology; (3) the types of problems encountered in the field; and (4) the prior art solutions to those problems.

29. My opinions as to the appropriate level of ordinary skill in the art are based upon these factors. For example, I have years of experience teaching students and working with engineers and professionals in the power electronics field. Further, I am familiar with the subject matter that is pertinent to the '577 Patent. I am also aware of the state of the art at the time the applications resulting in the '577 Patent were filed. I am familiar with the knowledge and capabilities of a POSITA in these fields during the relevant timeframes.

30. In my opinion, a POSITA at the time of the applications that resulted in the '577 Patent were filed would have had at least a bachelor's degree in Electrical Engineering or related field and at least five years of training or additional work experience in the area of power electronics

or a related field and have been knowledgeable about the operation of LEDs. More hands-on and design experience would compensate for less formal education, and vice versa.

VI. BACKGROUND

31. The ’577 Patent is entitled “Method and a driver circuit for LED operation.” The application that matured into the patent was filed in the US on May 22, 2007 and the patent issued on November 22, 2011. I understand that Signify alleges that the patent is entitled to a priority date, based on the Patent Cooperation Treaty (PCT) application filing date, no later than November 25, 2005, and potentially earlier based on earlier filed European applications to which the ’577 Patent claims priority or any evidence of the inventors’ earlier conception and reduction to practice of the invention. Within the relevant timeframe being considered here, my opinions set forth herein would not vary based upon the priority date that is ultimately decided upon by the Court.

32. The ’577 Patent is directed to a driver circuit for operating light emitting diodes (LED). *See* '577 Patent at 1:4-5. To operate, LEDs require precise voltage control, or preferably current control, as even small variations in voltage will result in large variations in current through the LEDs—and, consequently, large variations in the brightness of the LEDs. *See*, *id.* at 1:11-12. One method for controlling the current is to use a circuit known as a “switched mode power supply.” *Id.* at 1:18-19. Some switched mode power supplies, however, if not optimized for powering LEDs, exhibit various inefficiencies that can result in the need for large filtering circuits or large inductors. *Id.* at 1:36-41. The ’577 Patent thus discloses a drive circuit that is optimized to efficiently power LEDs. *See, id.* at 1:42-59.

VII. DISPUTED CLAIM TERMS IN THE ’577 PATENT

33. I understand that the parties disagree whether the terms “connected in series” or “coupled in series” should be given their plain and ordinary meaning or should be construed to mean “electrical current pass through [components] in turn without branching.” I also understand that the parties agree that these terms should be given the same construction. As discussed below, these terms are widely used and readily understood by those of ordinary skill without further definition.

34. I understand that Signify relies on the dictionary definition of "Series" from Webster's New World College Dictionary, which provides the following definition: "the arrangement of devices in a circuit such that current flows sequentially through a series of components." In my opinion, this is an accurate definition of "series" as used in the term "in series" and is consistent with the way that the term is used in the '577 Patent.

35. I understand that to deviate from the term's plain and ordinary meaning there would have to be either an explicit definition of "connected in series" or "coupled in series" in the specification of the '577 patent or there must be statements in the specification or prosecution history that clearly evidence an intent to disavow the plain and ordinary meaning of the claim. I see nothing in the specification or prosecution history of the '577 patent that seeks to give a special or different meaning to "connected in series" or "coupled in series." I also see no statements that indicate that the patentee intended to disavow this plain understanding of "connected in series" or "coupled in series." As a result, in my opinion, this term requires no construction because a person of ordinary skill would understand the phrases "connected in series" or "coupled in series" to have their commonly understood meaning.

36. In my opinion, the terms' plain and ordinary meaning is consistent with the way that the term is used in the specification.

37. For example, the specification describes "a resonant capacitor 6 connected in series to primary winding 8a." Each of these components are shown in annotated FIG. 1 below[1].

[1] Throughout this document, annotations to the figures are shown in red.

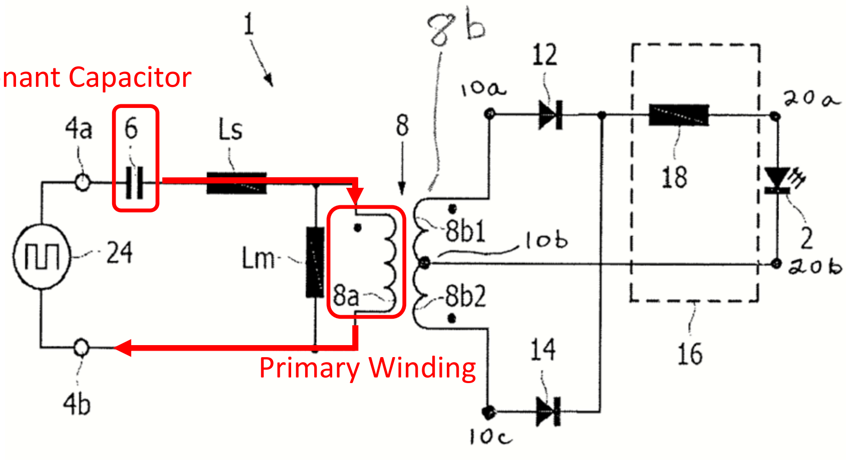


FIG. 1

The resonant capacitor (6) is arranged with the primary winding (8a) to permit current (represented by the red arrows) to flow sequentially through the resonant capacitor (6) and the primary winding (8a). In this arrangement, the current flows from voltage source 24 through input terminal (4a), through resonant capacitor (6), through primary winding (8a), and back to voltage source (24) via input terminal (4b).

38. The independent claim requires an "inductor connected in series with the output terminals." An example of this is shown in the annotated example of FIG. 1, below:

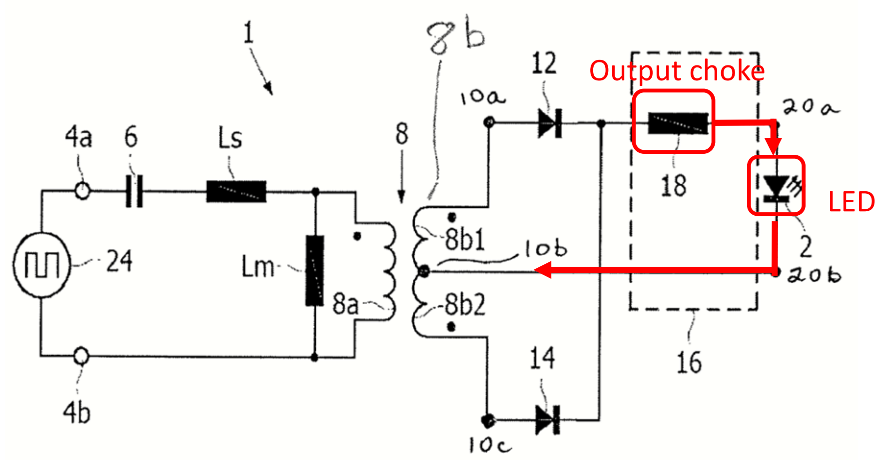


FIG. 1

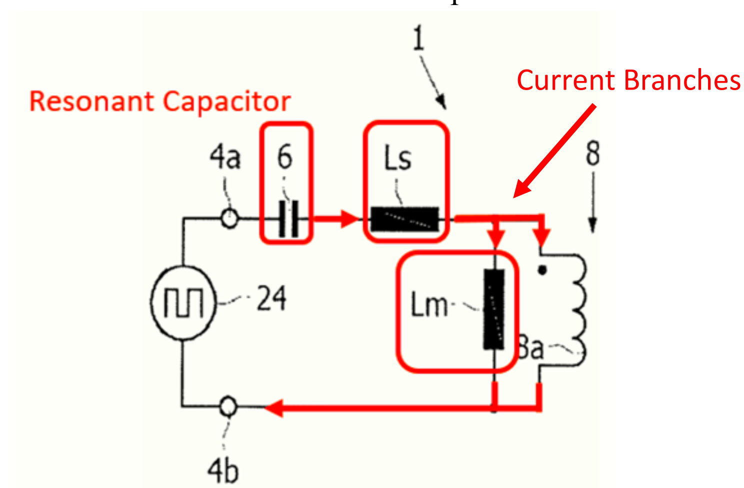
39. The output choke (18), shown in FIG. 1, is described in the specification as "a suitable inductor," and so the arrangement of FIG. 1 is an example of the arrangement described in claim 1, i.e., an "inductor connected in series with the output terminals."

40. The output choke is arranged with output terminals (20a) and (20b) to permit the current to flow sequentially through the output choke (18), through output terminal (20a), and through output terminal (20b). This series connection assumes that the LED (2) is connected to the output terminals (20a,20b) to provide a path to permit current to flow between them. *See,* '577 Patent at 3:41-46.

41. The plain and ordinary meaning as explained above accounts for both of these examples in the specification.

42. Defendants' construction, by contrast, adds a negative limitation, requiring that the current flow through the components in turn "without branching." This negative limitation is inconsistent with at least two different examples in the specification.

43. First, the specification describes the "resonant characteristic of the series connection of the resonant capacitor 6 and the inductances Ls and Lm of the primary winding 8a." '577 Patent 4:11-12. This arrangement is emphasized in the excerpt of annotated FIG. 1 below (the right-hand side of the circuit has been omitted to focus on the salient aspects of this series connection):



44. Inductance Ls is a model of a "stray inductance" of the primary winding of transformer 8, Lm is a model of a "main" inductance of the primary winding of transformer 8, and

the element 8a is a model of the ideal behavior (without the inductances or other parasitic elements) of the primary winding of transformer 8. In this model, the model of the primary winding (8a) branches from the modeled main inductance Lm, thus providing two paths for the current flowing from resonant capacitor (6). While these modeled inductances are not "actual elements," (3:24-27), the specification still uses the phrase "series connection" to describe the flow of current through the modeled elements as depicted. Thus, the description of the modeled elements can be relied upon for understanding how the patent uses "in series."

45. The current flowing out of the resonant capacitor (6) and inductance Ls branches into two paths. A first part of the current passes through inductance Lm and a second part of the current passes through the model of primary winding (8a). As a result, the phrase "without branching" as it appears in Defendants' construction is inconsistent with the specification's description of the resonant capacitor (6) being connected in series with both inductance Lm and primary winding (8a). In contrast, a POSITA would readily understand the description in the patent in its plain and ordinary meaning, i.e., that the resonant capacitor is connected in series with Ls and Lm to create a resonant circuit despite the branching path through the model of winding 8a.

46. Second, claim 7 of the '577 Patent requires a "control circuit" having a "control input terminal for receiving a LED control signal." An example of this is shown in FIG. 2 of the '577, in which control circuit 34 receives the "control signal 38 as an input." '577 Patent, 3:55-61. The specification explains that the "LED control signal 38 is a LED voltage." Id. In other words, the voltage across the LED is measured and provided as an input to the control circuit (34). This requires, as shown in the annotated FIG. 2, that the input to the control circuit (34) be connected after the output choke (18):

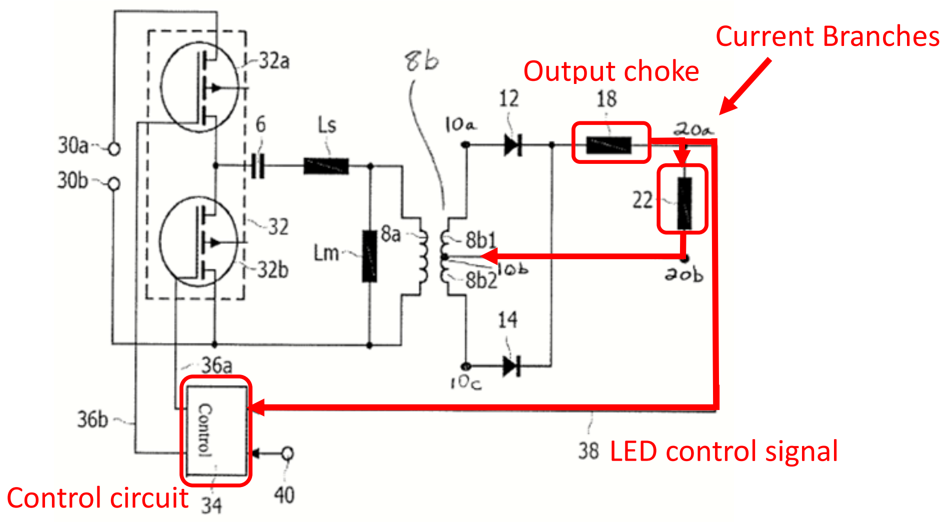


FIG. 2

47. This requires that the current to the LED load (22) branch to provide a measurement of the LED voltage to the control circuit (34). However, the ’577 Patent states that the “current generated in the secondary winding of the transformer flows through a LED or a series of LEDs connected in series with an inductor.” ’577 Patent, 1:23-25. Under the Defendant’s negative limitation “without branching,” the LEDs would not be connected in series with the output choke inductor 18 when the LED voltage is measured for the control circuit as depicted in Fig. 2. In contrast, a POSITA would readily understand the description in the patent in its plain and ordinary meaning, i.e., that the LEDs are connected in series with the output choke despite the branching circuit created by the LED voltage measurement.

48. The Defendants’ negative limitation “without branching” fails to account for at least these two separate examples of components “in series” described in the patent specification and would not be consistent with the understanding of a person of ordinary skill in the art.

49. Additionally, all transformers naturally have a leakage inductance and parasitic capacitance because of the manner in which they are constructed. The ’577 Patent itself mentions there will be a leakage inductance (1:49-59) that will provide an additional path for current. Moreover, the parasitic capacitance that naturally exists between the primary winding (8a) and the secondary winding (8b) of the transformer will create an additional path for current entering the

primary winding (8a) to branch and flow to the secondary winding (8a), meaning that the current entering the primary winding (8a) will not equal the current exiting the primary winding (8a) as some will flow to the secondary winding (8b). Defendants' construction is inconsistent with the natural operation of all transformers, including transformer (8), because it requires the current to pass through primary winding "without branching."

50. Thus, it is my opinion that the terms "connected in series" and "coupled in series" should be given their plain and ordinary meaning, as a POSITA would understand the scope of these terms. Defendants' suggested construction, including "without branching," is inconsistent with the way that the specification uses the terms and with the inherent nature of transformers in operation.

IX. CONCLUSION

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 4th day of August, 2023.

Dr. Regan Zane